

Study unveils stellar population properties of galaxies in LAMOST spectral survey

February 18 2022, by Li Yuan



Credit: CC0 Public Domain

Based on the LAMOST data, Wang Lili, a PhD candidate from Dezhou University, and her collaborators have derived the age and metallicity of the stellar populations of about 43,000 galaxies in DR7 of LAMOST spectral survey.

The derived results have been included in a LAMOST value-added catalog, enriching the galaxy data of LAMOST. LAMOST, the Large Sky Area Multi-Object Fiber Spectroscopic Telescope, is operated by

the National Astronomical Observatories of Chinese Academy of Sciences (NAOC).

The study was published in *The Astrophysical Journal Supplement Series*.

Galaxies are systems of stars, gas, and dust. A galaxy spectrum in optical wavelength, which is mainly composed of the accumulated light of hundreds of billions of stars, encodes the age and metallicity distributions of stars. From stellar population analysis of galaxy spectra, the [star formation](#) and chemical evolution history of [galaxies](#) are expected to be decoded.

The common method of stellar population analysis is the template fitting based on full spectrum. However, uncertainties always exist as a result of the inaccuracy of flux calibration or high dust density of galaxies.

In this study, the researchers proposed a template fitting method based on small-scale features to estimate the average age and metallicity of LAMOST galaxies.

This new method separates the small-scale features, namely the absorption features, from the large-scale components in the galaxy spectra, and only fits the observed small-scale features with models, which is not affected by the global shape of the continuum.

The results of several tests and comparisons have proved that the properties derived by this method are reliable. "One advantage of this method is that it is suitable for the stellar population analysis of galaxies with uncertain flux calibration or spatially non-uniform dust attenuation, which is difficult in classic methods," said WANG.

This work provides the first estimation of the age and metallicity for galaxies in the LAMOST spectroscopic survey, which will play an

important role in the study of the physical properties of the low redshift galaxies and galaxy systems.

More information: Li-Li Wang et al, Stellar Populations of Galaxies in the LAMOST Spectral Survey, *The Astrophysical Journal Supplement Series* (2021). [DOI: 10.3847/1538-4365/ac3241](https://doi.org/10.3847/1538-4365/ac3241)

Provided by Chinese Academy of Sciences

Citation: Study unveils stellar population properties of galaxies in LAMOST spectral survey (2022, February 18) retrieved 17 July 2024 from <https://phys.org/news/2022-02-unveils-stellar-population-properties-galaxies.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.